Claims

WE CLAIM:

1. A method for removing a protecting group from a protected nucleoside or a protected nucleotide, the method comprising reacting the protected nucleoside or protected nucleotide with a nucleophile that exhibits an α-effect at conditions of mildly basic pH.

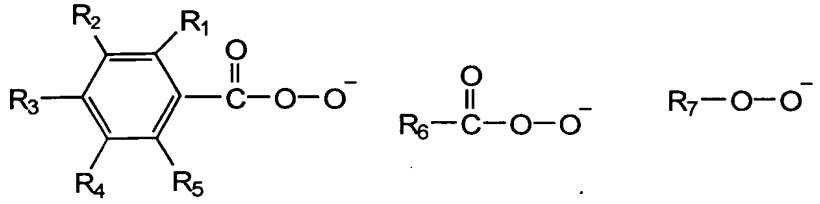
2. The method of claim 1 wherein the nucleophile is a peroxide.

3. The method of claim 2 wherein said peroxide is an inorganic peroxide of the formula XOOH, wherein X is a counterion.

4. The method of claim 3 wherein said counterion is selected from the group consisting of H^+, Li^+, Na^+, K^+, Rb^+, Cs^+.

5. The method of claim 2 wherein said peroxide is an organic peroxide of the formula ROOH, wherein R is selected from the group consisting of alkyl, aryl, substituted alkyl, and substituted aryl, and mixtures thereof.

6. The method of claim 2 wherein said peroxide is an organic peroxide having one f the following structures:



where each R_1 - R_7 is one of: H, alkyl, aryl, aralkyl, cycloalkyl, cycloalkylalkyl, alkenyl, cycloalkenyl, alkynyl aralkynyl, cycloalkynyl, substituted aralkyl, substituted cycloalkyl, substituted cycloalkylalkyl, substituted alkenyl, substituted cycloalkenyl, substituted alkynyl substituted aralkynyl, substituted cycloalkynyl

7. The method of claim 2 wherein said peroxide is one of t-butyl hydroperoxide, metachloroperoxybenzoic acid, and mixtures thereof.

8. The method of claim 1 wherein said reacting at conditions of mildly basic pH comprises reacting at a pH at which said nucleophile exhibits a maximum α-effect.

9. The method of claim 1 wherein said reacting at conditions of mildly basic pH comprises reacting at a pH that is greater than the pKa of said nucleophile.

10. A method for synthesizing an oligonucleotide, comprising providing a protected nucleoside or nucleotide, and then iteratively carrying out the steps of (a) deprotecting said nucleoside or nucleotide by reaction of said protected nucleoside or nucleotide with a nucleophile that exhibits an α-effect at conditions of mildly basic pH, and (b) contacting said deprotected nucleoside or nucleotide with a protected phosphoramidite to couple said deprotected nucleoside or nucleotide with said protected phosphoramidite.

11. The method of claim 10 wherein said protected nucleoside or nucleotide is an oxycarbonyl protected nucleoside or nucleotide.

12. A kit for synthesizing an oligonucleotide on a support, comprising a hydroxyl derivatized support surface, a protecting group for protecting hydroxyl moieties on said derivatized support surface, at least one protected nucleoside, at least one nucleoside phosphoramidite, a nucleophile that exhibits an α-effect at conditions of mildly basic pH, and reagents suitable for establishing the pH condition and for carrying out reactions of deprotection, phosphoramidite coupling, and oxidation to form an internucleotide bond.

13. A method for making an oligonucleotide array made up of array features each presenting a specified oligonucleotide sequence at an address on an array substrate, the method comprising steps of

providing a hydroxyl derivatized array substrate and treating the array substrate to protect hydroxyl moieties on the derivatized surface from reaction with phosphoramidites,

then iteratively carrying out the steps of

(a) applying droplets of an α-effect nucleophile to effect a deprotection of hydroxyl moieties at selected addresses, and

(b) flooding the array substrate with medium containing a selected protected phosphoramidite to permit coupling of the selected phosphoramidite onto the deprotected hydroxyl moieties at the selected addresses.

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